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ABSTRACT

This program, included in "Effective Reading Programs...," serves 1,500-2,000 kindergarten and first-grade children in three districts. The program is designed to train school personnel to identify perceptual deficits in areas specifically undergirding the reading process in kindergarten or first-grade children and to implement needed remediation so that students will be able to profit from formal reading instruction. At the beginning of the program, 20 reading teachers representing eight school districts attended a four-week summer workshop. These teachers were trained to administer screening instruments to kindergarten children entering first grade, to interpret the results, and to prescribe and implement activities to help identified children overcome their perceptual or developmental lags. Remediation activities used include training in auditory and visual discrimination of objects, letters, and words; visual-motor coordination; knowledge of the alphabet; recognition and reproduction of sight words; and concept formation. The program includes a monitoring and evaluation component and regularly scheduled supervision of the program participants by the director and staff. (WR)

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PREVENTION OF READING DISABILITY THROUGH EARLY DIAGNOSIS AND REMEDIATION:

A Project Supported by
Mental Health Association of Southeastern Pennsylvania
and
Philadelphia Public Schools

Two years ago, a study of children in the first grade at Mifflin School by a team at what was then Women's Medical College (now Medical College of Pennsylvania) came to the attention of the School Advisory Committee of the Mental Health Association of Southeastern Pennsylvania. This study showed that over 50% of these first graders suffered from perceptual deficits of one kind or another. Considerable evidence exists that perceptual problems are directly correlated with difficulties in reading (e.g. Buktenica, 1968; de Hirsch et al, 1966). This would seem to be consistent with the work of such developmental psychologists as Piaget (1967), Gesell (1940) and Ilg and Ames (1965). The scope of the problem was exacerbated by the further finding of the Research Department of the Philadelphia School System that 85,000 children in the Philadelphia School System were afflicted with perceptual deficits. Reading, always basic to education, was now an admittedly high nation-wide priority due to the emphases given it by Dr. James S. Allen, then Commissioner of Education[1]. Since the greater proportion of school children in Philadelphia were achieving considerably below the national norms on standardized tests[2] it was felt that this high incidence of perceptual problems had important implications for future reading success. It was hypothesized that if these deficits were identified and ameliorated before formal reading instruction was begun, much of the subsequent reading retardation could be prevented.

The question that arose from these findings and concerns was: what is the most efficient and effective program for discovering these perceptual deficits and implementing remediation for these youngsters so that when they are given formal reading instruction, they will be able to respond profitably to it. Several guidelines

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[1] The Right to Read (1969)
[2] See report of Department of Research

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influenced the direction that the program ultimately took. (1) Limited funds were available. This ruled out wide-scale retraining of all elementary classroom teachers. (2) The program should have a strong commitment to direct services to children. This meant that what was wanted was a program that could reach a large number of children as quickly as possible. (3) A strong evaluation component should be built in. After the program had been in operation for a year, a documental statement was necessary as to its effectiveness, and what recommendations could be made for its improvement. (4) Personnel already in the schools and familiar with the reading situation in the various buildings were to be utilized. The reading teachers were the logical choice both because of their expertise in the field and because the Philadelphia School System had been redefining the role of the reading teacher in a new and more effective school leadership fashion. It was felt therefore that the participating elementary reading teachers should be trained both to screen youngsters entering Kindergarten and first grade and to remediate those deficits exhibited. Each trained reading teacher could then be a nucleus for training classroom teachers in the various schools and districts.

Methods and Procedure

Procedure: The Mental Health Association developed a committee made up of specialists from the Board of Education and from local universities and hospitals. Donald Farrow, Educational Director of the Mental Health Association, served as chairman and general trouble-shooter for the activities planned. This committee developed a workshop that is described below.

A four-week workshop was held following the closing of the school year 1969-70 to train 20 reading teachers. The participating reading teachers were selected by the District Superintendents from the eight (8) school districts in order to spread the effect of this program throughout the whole school system. Selection of these teachers was based on their expressed interest in the program, their background of experience and academic training, and the interest and commitment of their principals to implement and support the program in the coming school year.

The purpose of the workshop was to train reading teachers in early diagnosis and prevention of reading disabilities; they, in turn, were to instruct other teachers in these areas. This was accomplished by teaching them (1) to administer screening instruments to kindergarten or first grade pupils and (2) to interpret the results in order to sensitize them to the children's present level of performance in the areas needed for beginning reading instruction and (3) to prescribe and implement measures which would help these children to overcome the developmental lags revealed by testing which might lead to reading disabilities. The participants were trained through working directly with children, so that they might assist the regular classroom teachers to use these screening instruments and, on the basis of the results obtained, tailor prescriptive instruction.

The workshop was held at Hartranft School, 9:00 a.m. to 12:00 noon, Monday through Friday, from June 29th to July 24th, 1970. Kindergarten children from the school population at Hartranft were randomly selected so that the participants could work with them in using their diagnostic instruments and intervention techniques. Two additional elementary teachers were hired to supervise the youngsters and reinforce prescribed instruction during the times they were not involved in actual diagnostic or remedial activities.

The two basic instruments that were used were the Valett Developmental Survey of Basic Learning Abilities and the abbreviated Katrina de Hirsch Predictive Index. It was found that the combined use of these tests provides an adequately comprehensive profile of a child's strengths and weaknesses in the perceptual areas related to reading. The Metropolitan Reading Test, administered pre and post to both groups, was the criterion test.

The Valett subtests deal with Motor Integration and Physical Development, Tactile Discrimination, Auditory Discrimination, Visual-Motor Coordination, Visual Discrimination, Language Development and Verbal Fluency, and Conceptual Development. The components of the de Hirsch Index are Pencil Use, selected parts of the Bender Visuo-Motor Gestalt Test, an abbreviation of Wepman Auditory Discrimination Test,

Number of Words Used in a Story, Categories, Horst Reversals Test, Gates Word-Matching Subtest, Word Recognition I and II, and Word Reproduction. The time required to administer the entire battery to a given child was approximately two to two and one-half hours. The practicality of this under present classroom limitations led to subsequent research to shorten the testing time by studies of: which of the subtests overlapped; which showed the least correlation to reading achievement as tested by a standardized test; which could be group administered.

Daily assessment of workshop participants was made by the staff. Instruments for evaluation were developed with the Department of Research of the Board of Education. Evaluations of the reading teachers at the close of the workshop were done by the workshop staff. Assessments of trainees were made on the basis of their skills in using diagnostic technique and their selection and application of appropriate developmental techniques.

The faculty of the Summer Workshop consisted of:

DIRECTOR....(1) Beatrice J. Levin, Ed.D., Staff Specialist in Reading, Board of Ed.

(2) Mr. Robert Rabinowitz, Mental Health Consultant to Schools, Pennsylvania Hospital Community Mental Health Center

(3) Beth Stephens, Ph.D., Associate Professor of Special Education, Temple University

(4) Dr. Nettie Bartel, Assistant Professor of Special Education in the area of Learning Disabilities, Temple University, replaced Dr. Morgan in September for the year's supervision of the program in the schools.

(5) Two (2) Elementary Teachers (to provide continuity of development for the 20 children)

*NOTE: Olive J. Morgan, Ph.D., Associate Professor of Pediatrics, Woman's Medical College of Pennsylvania, who helped plan the workshop, was unable to join its faculty due to an accident.

The summer workshop faculty undertook the task of giving regular support and supervision to the programs in the individual schools throughout the year. Each faculty members was responsible for specific schools in the program.

Although the program had been planned to implement the diagnosis and remediation as soon as the schools opened in September, a number of circumstances mitigated against this. In a number of instances, the reading teachers were shifted to other positions of responsibility - one left the Philadelphia system, two were promoted, several were assigned other responsibilities, and one was placed into a regular classroom teaching position. One principal, although earlier agreeing to support the program, found it impossible to release the reading teacher to spend any significant amount of time on the project. Modifications in the original procedures to fit individual schools and orientation of principals delayed the actual implementation of the program. The overshadowing threat of a school strike, and then the strike itself caused further delays. Continuing problems of finding time for the reading teachers to work on the project were very real difficulties at several schools - particularly when it became colder and teacher absenteeism rose. In some schools, reading teachers were covering other classes daily until 10:30 or 11:00 each morning for weeks. These circumstances severely hampered the efforts of the reading teachers and the consultants to implement the program according to schedule.

However, notwithstanding the difficult situations in which most reading teachers found themselves, programs were implemented in fifteen schools. Most of these did not get really underway until December or January. Diagnosis was completed in most instances by February first, with remediation occurring until the middle of May, at which point post-testing took place. School-by-school descriptions of conditions and schedules follow. Data are reported only for those schools in which at least two and a half months of remediation took place, and in which usable data were collected. These conditions led to the excluding of the results of seven additional schools. The fact that the results of work in these schools is not reported here does not mean that effective remediation did not occur there; it simply means that the data collected was

too incomplete or unreliable to document the growth that occurred.

Methodology

Sample: The sample populations consisted of 15 to 30 Experimental (E) and 15 to 30 Control (C) first-grade children in each of the participating schools. E's and C's were randomly selected from the entire first grade population in each school. Attrition of schools as indicated above, occurred due to teacher transfers, lack of time scheduled for the project, and principal's lack of interest or time. Attrition of subjects within schools occurred primarily because children moved to other schools, or because of extensive absenteeism during the pre or post-testing.

Measures: To assess the effectiveness of the diagnostically-based intervention, it was decided to administer the Metropolitan Reading Readiness Test Pre and Post to all children - both Experimental and Control. All Experimental children received the Valett and de Hirsch as part of their diagnosis at the beginning of the project. In addition, three randomly selected Control children from each group were given the Valett and de Hirsch batteries both as a pre and as a post-test. Three experimental children were also given the entire battery as a post-test.

Gideon School: Reading Teacher, Mrs. G. Cooper

The program at Gideon got started in November with Mrs. Cooper beginning to give the Valett and Dellirsch tests to 33 first-graders randomly assigned E or C from two first grade classes. All testing was completed by the middle of January, with the remainder of the month being used for profiling strengths and weaknesses. At the beginning of February, remediation began in earnest with both Mrs. Cooper and a Temple graduate student in Special Education spending 10 hours each week on remediation. This phase of the project continued until the end of May, when post-testing was done.

A small room at the back of the stage was used for both testing and remediation. Some heating problems added to the discomfort and inconvenience of the room. Remediation materials were sparse, but were supplemented by materials contributed by Mrs. Cooper and the Temple student.

Principal support was strong. Considerable staff development took place; two formal afternoon workshops with the kindergarten and primary teachers were given in addition to a considerable amount of less structured staff development.

Youngsters in the program at Gideon made clear and unequivocal gains; control children not in the program did not make gains. The data clearly support the fact that the program was extremely successful at Gideon.

The regular reading program used in the school was BRL.

Analysis of Va.iance
on Metropolitan Pre- and Post-Scores
at Gideon School

Experimental Group
n = 17

Subtest	Pre-Mean	Pre-s.d.	Post Mean	Post s.d.	df	SS	MS	F
Word Meaning	6.47	2.10	7.35	2.23	1	6.62	6.62	1.41
Error					32	150.12	4.69	
Listening	8.47	2.45	9.76	2.33	1	14.24	14.24	2.49
Error					32	183.29	5.73	
Matching	7.82	2.48	10.47	2.43	1	59.56	59.56	9.89**
Error					32	192.71	6.02	
Alphabet	10.71	4.55	14.12	2.23	1	98.94	98.94	7.70**
Error					32	411.29	12.85	
Numbers	9.18	3.47	14.59	4.30	1	248.94	248.94	16.30**
Error					32	488.59	15.27	
Copying	4.47	2.87	6.53	2.79	1	36.03	36.03	4.49*
Error					32	256.47	8.01	
Total	47.53	12.43	62.82	11.89	1	1988.24	1988.24	13.43**
Error					32	4736.71	148.02	

Analysis of Variance
on Metropolitan Pre- and Post-Scores
at Gideon School

Control Group
n = 16

Subtest	Pre-Mean	Pre-s.d.	Post Mean	Post s.d.	df	SS	MS	F
Word Meaning	11.87	18.34	8.31	2.47	1	101.53	101.53	.59
Error					30	5137.19	171.24	
Listening	16.50	27.66	10.56	2.71	1	282.03	282.03	.73
Error					30	11583.94	386.13	
Matching	9.31	8.55	10.00	2.28	1	3.78	3.78	.10
Error					30	1175.44	39.18	
Alphabet	14.75	12.67	14.81	2.74	1	.03	.03	.00
Error					30	2521.44	84.05	
Numbers	15.44	17.60	16.00	3.72	1	2.53	2.53	.02
Error					30	4853.94	161.80	
Copying	4.63	2.68	5.94	1.70	1	13.78	13.78	2.74
Error					30	150.69	5.02	
Total	72.50	82.75	66.25	8.40	1	312.50	312.50	.09
Error					30	103775.00	3459.17	

Harrity School: Reading Teacher, Mrs. B. Cooper

The reading program at Harrity was a combination of BRL (limited contract of $20.00 per child) and Multilevel (SRA, Scholastic Enrichment, etc.) Major strengths in the situation at Harrity were an especially competent (but overworked) reading teacher and an interested and cooperative principal. There was a separate room into which children could be brought for testing and remediation.

Two moderate ability classes were selected for the experiment, and randomly designated experimental or control. Total number of children was E = 26, C = 26.

All testing, - Metropolitan, De Hirsch, Valett, - was completed by the end of January. Two Temple graduate students in Special Education were assigned to assist in the remediation phase of the program, beginning February 1st. They were trained and supported by the reading teacher and the supervising workshop faculty member. An average of 20 hours per week was spent by the two girls in remediation for the months of February through May. Each diagnostic group was seen at least twice a week for a minimum total of 1½ hours. Absenteeism was a relatively minor problem.

Amount of materials for remediation was generally adequate, although the Temple students brought in much of their own. Average amount of remediation by any child was about 22 hours.

Overall growth in children at Harrity was impressive in both E and C groups.

Analysis of Variance
on Metropolitan Pre- and Post-Scores
at Harrity School

Experimental Group
n = 26

Subtest	Pre-Mean	Pre-s.d.	Post Mean	Post s.d.	df	SS	MS	F
Word Meaning	7.31	1.87	8.23	2.05	1	11.08	11.08	2.88
Error					50	192.25	3.84	
Listening	9.04	1.97	10.27	1.98	1	19.69	19.69	5.07*
Error					50	194.08	3.88	
Matching	9.50	2.45	11.69	2.05	1	62.48	62.48	12.20**
Error					50	256.04	5.12	
Alphabet	14.92	1.52	15.73	.45	1	8.48	8.48	6.73*
Error					50	62.96	1.26	
Numbers	13.61	3.25	18.08	3.22	1	258.77	258.77	24.69**
Error					50	524.00	10.48	
Copying	5.50	1.92	6.04	1.66	1	3.77	3.77	1.17
Error					50	161.46	3.23	
Total	59.77	6.59	70.11	6.40	1	1391.56	1391.56	32.96**
Error					50	2111.27	42.23	

Analysis of Variance
on Metropolitan Pre- and Post-Scores
at Stokley School

Control Group
n = 23

Subtest	Pre-Mean	Pre-s.d.	Post Mean	Post s.d.	df	SS	MS	F
Word Meaning	6.57	1.38	6.61	1.85	1	.02	.02	.01
Error					44	117.13	2.66	
Listening	8.87	1.02	10.43	2.54	1	28.17	28.17	5.79*
Error					44	214.26	4.87	
Matching	8.13	3.70	9.39	3.34	1	18.28	18.28	1.47
Error					44	546.09	12.41	
Alphabet	13.26	3.92	14.09	2.56	1	7.85	7.85	.72
Error					44	482.26	10.96	
Numbers	12.09	3.26	14.17	4.46	1	50.09	50.09	3.28
Error					44	671.13	15.25	
Copying	6.22	1.91	8.04	2.77	1	38.35	38.35	6.78*
Error					44	248.87	5.66	
Total	55.13	11.73	62.74	12.84	1	665.76	665.76	4.40*
Error					44	6653.04	151.21	

* - Significant at .05 level of confidence
** - Significant at .01 level of confidence

Stokley School: Reading Teacher, Miss Matthews

Stokley School got off to a slow start on this program. The reading teacher was badly overworked, and although she had scheduled from 11:00 to 12:00 daily to work on the project, many days she was able to spend no time at all. Much of her time was spent covering classes and providing leadership in BRL program. By January 15, all the Metropolitans had been given and scored, and some testing on the Valett had occurred. February 1st, two graduate students from the Temple special education department were brought in. These two girls finished the testing (by February 20) and began remediation. A total of 18 hours a week was spent by the two girls in remediation. Each diagnostic group was seen at least twice a week for 30 minute sessions, with the exception of the Visual Discrimination group which was seen only for 30 minutes a week. Absenteeism was a severe problem in two cases.

Experimental and Control groups were randomly selected from the two first grade classes. Total number of children was 45.

Results at Stokley very clearly show the beneficial effects of remediation. Control children did not show significant gains on any Metropolitan sub-test except Copying; Experimental children made significant gains on Listening, Matching, Alphabet and Numbers. On city-wide tests, children in the first six grades of this school show the poorest overall achievement of any school. This showed up on the very low scores obtained on the De Hirsch and Valett, as well as the Metropolitan. It appears that this severely disadvantaged group of children can make gains when supported by this program.

Analysis of Variance
on Metropolitan Pre- and Post-Scores
at Stokley School

Experimental Group
n = 22

Subtest	Pre-Mean	Pre-s.d.	Post Mean	Post s.d.	df	SS	MS	F
Word Meaning	7.50	1.68	7.55	1.99	1	.02	.02	.01
Error					42	142.95	3.40	
Listening	8.05	2.73	10.41	2.67	1	61.45	61.45	8.43**
Error					42	306.27	7.29	
Matching	8.91	3.05	10.91	1.69	1	4.4.00	44.00	7.23*
Error					42	255.64	6.09	
Alphabet	13.32	3.17	15.27	1.39	1	42.02	42.02	7.03*
Error					42	251.14	5.98	
Numbers	12.73	4.61	17.05	3.79	1	205.11	205.11	11.53**
Error					42	747.32	17.79	
Copying	6.00	2.54	7.55	2.82	1	26.27	26.27	3.64
Error					42	303.45	7.23	
Total	56.64	12.46	68.36	9.73	1	1512.82	1512.82	12.10*
Error					42	5250.18	125.00	

Analysis of Variance
on Metropolitan Pre- and Post-Scores
at Harrity School

Control Group
n = 24

Subtest	Pre-Mean	Pre-s.d.	Post Mean	Post s.d.	df	SS	MS	F
Word Meaning	7.42	1.41	9.46	2.25	1	50.02	50.02	14.22**
Error					46	161.79	3.52	
Listening	8.79	2.21	10.79	1.47	1	48.00	48.00	13.64**
Error					46	161.92	3.52	
Matching	9.12	2.56	11.71	2.20	1	80.08	80.08	14.08**
Error					46	261.58	5.69	
Alphabet	15.37	.97	15.83	.48	1	2.52	2.52	4.30*
Error					46	26.96	.59	
Numbers	14.67	2.51	17.71	2.82	1	111.02	111.02	15.56**
Error					46	328.29	7.14	
Copying	5.62	1.84	6.67	2.75	1	13.02	13.02	2.39
Error					46	250.96	5.46	
Total	61.00	5.65	71.33	6.36	1	1281.33	1281.33	35.39**
Error					46	1665.33	36.20	

Powers School: Reading Teacher, Miss Principe

A room and instructional materials were available for tutorial sessions, and the reading teacher who was in charge of the project was supportive. However, after agreeing to participate in the study the school became involved in two other reading projects, and, at the request of the school system, the teacher's obligations to them took precedence.

Originally, one aide and three volunteers were designated as tutorial assistants; later, demands of other projects precluded their participation. Because of these conditions, discontinuance of the project in this school was considered in January, 1971. However, the screening battery had been administered to the experimental subjects, and pupils with developmental deficits had been identified with five remedial groups formed. Therefore, the teacher, working alone, attempted to see each of the five groups once a week for a forty-minute period for the three-month period February 15 to May 15. Conflicting demands made it impossible to adhere to the schedule. Under these conditions the similarity of performance for the experimental and control groups on the post-test measure was expected. On only one variable, Listening, did the experimental group show significant improvement when the control group did not. In turn, the control group, not the experimental group, showed significant improvement on word meaning. Results presented in Table indicate near equivalent performance for the two groups, groups whose lack of remedial experience was essentially the same.

Analysis of Variance
on Metropolitan Pre- and Post-scores
at Powers School

Experimental Group
n = 19

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Word Meaning	5.47	2.06	6.42	2.19	1	8.53	8.53	1.88
Error					36	163.37	4.54	
Listening	7.42	2.14	9.53	3.03	1	42.11	42.11	6.13 *
Error					36	247.37	6.87	
Matching	5.42	5.10	10.79	3.07	1	273.79	273.79	15.45 **
Error					36	637.79	17.72	
Alphabet	8.21	4.59	11.89	5.82	1	128.95	128.95	4.69 *
Error					36	988.95	27.47	
Numbers	10.26	4.69	17.05	5.51	1	437.92	437.92	16.72 **
Error					36	942.63	26.18	
Copying	6.21	4.13	8.21	3.15	1	38.00	38.00	2.81
Error					36	486.32	13.51	
Total	43.00	18.51	63.90	18.89	1	4147.61	4147.61	11.85 **
Error					36	12595.79	349.88	

Analysis of Variance
on Metropolitan Pre- and Post-scores
at Powers School

Control Group
N = 8

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Word Meaning	3.75	1.91	7.25	2.25	1	49.00	49.00	11.25 **
Error					14	61.00	4.36	
Listening	8.38	2.07	10.38	2.45	1	16.00	16.00	3.12
Error					14	71.75	5.12	
Matching	7.12	3.40	10.75	1.67	1	52.56	52.56	7.33 *
Error					14	100.38	7.17	
Alphabet	9.12	4.49	14.38	2.07	1	110.25	110.25	9.04 **
Error					14	170.75	12.20	
Numbers	10.50	5.21	16.12	3.72	1	126.56	126.56	6.18 *
Error					14	286.88	20.49	
Copying	6.50	2.88	8.38	2.33	1	14.06	14.06	2.05
Error					14	95.88	6.85	
Total	45.38	14.36	67.25	7.13	1	1914.06	1914.06	14.90 **
Error					14	1799.38	128.53	

Steele School: Reading Teacher, Mrs. Lillian Milan.

Participation in the study was desired by both the reading teacher and the principal, and a small room and limited equipment were available for a portion of the day. Administration of the screening battery was completed by January 1971. Aides, however, were not available, and it was impossible for the reading teacher to assume responsibility for the tutorial sessions. During January and February one of the remedial groups was seen one time. Decision was made to use the service of a special education graduate student from Temple University. He conducted his initial remedial session on February 26th. For a seven-week period tutorial services were available to two groups of students, seven students per group, two days a week, for 45 minutes a day. The regular classroom teacher for the experimental group was on sick leave for five months of the school year, and the room experienced a continuous change in substitute teachers; because of this, the school was concerned over the lack of progress made during this year by all pupils in the room, including those not identified as having developmental deficits. Perusal of Table indicates near identical performance by the two groups. Conclusions are that remediation twice weekly for a seven-week period made it possible for a room which had a succession of substitute teachers to show year-end gains commensurate with a room which had continuous instruction by one teacher during the academic year.

Analysis of Variance
On Metropolitan Pre- and Post-scores
at Steele School

Experimental Group
n = 29

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Word Meaning	6.10	1.47	6.62	1.93	1	3.88	3.88	1.31
Error					56	165.52	2.96	
Listening	9.38	1.59	10.34	2.21	1	13.52	13.52	3.65
Error					56	207.38	3.70	
Matching	8.90	2.43	10.93	1.69	1	60.02	60.02	13.74 **
Error					56	244.55	4.37	
Alphabet	13.10	3.19	15.48	.74	1	82.09	82.09	15.33 **
Error					56	299.93	5.36	
Numbers	11.03	4.00	15.97	2.93	1	352.57	352.57	28.70 **
Error					56	687.93	12.28	
Copying	6.83	2.45	6.24	1.77	1	4.98	4.98	1.09
Error					56	255.45	4.56	
Total	55.69	7.87	65.45	5.95	1	1380.84	1380.84	28.37 **
Error					56	2725.38	48.67	

Analysis of Variance
on Metropolitan Pre- and Plst-scores
at Steele School

Control Group
n = 26

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post-S.D.	df	SS	MS	F
Word Meaning	7.27	1.12	7.31	2.07	1	.02	.02	.01
Error					50	138.65	2.77	
Listening	9.69	1.38	10.46	2.34	1	7.69	7.69	2.09
Error					50	184.00	3.68	
Matching	8.38	2.16	11.00	2.08	1	88.92	88.92	19.84 **
Error					50	224.15	4.48	
Alphabet	12.81	3.80	15.42	1.60	1	88.92	88.92	10.48 **
Error					50	424.38	8.49	
Numbers	12.62	3.07	15.12	3.40	1	81.25	81.25	7.74 **
Error					50	524.81	10.50	
Copying	6.88	2.49	7.35	2.93	1	2.77	2.77	.38
Error					50	368.54	7.37	
Total	57.58	9.23	66.54	7.60	1	1044.02	1044.02	14.60 **
Error					50	3574.81	71.50	

Dobson School: Reading Teacher - Mrs. Alice Carr

Dobson is a small, older school in the Roxborough section of Philadelphia. Since there was only one first grade class, it was randomly divided into an experimental group (N=12) and a control group (N=12)

The reading teacher and this program were supported by the principal; however, since Mrs. Carr was the only reading teacher in the school, she had many responsibilities to the teachers and children of other grades. The remediation for this program was therefore not as extensive or intensive as would have been desirable. Tutoring for the experimental was done for 45 minute periods with mean of 23 total tutoring hours per child. No aid or other supplementary help was available, and all of the diagnoses and remediation was done by the reading teacher. Absenteeism was not excessive and the instructional materials and room for remediation were adequate.

Despite the lack of aids and the reduced time for remediation, the experimental group made significant gains on all six subtests of the Metropolitan; Word Meaning and Alphabet Recognition were significant at the .01 level of confidence, and the other subtests were significant at the .05 level.

The control group made significant gains only at the .05 level of confidence in 3 of the subtests, significant gains at the .01 level in one subtest and no significant gains in the other subtest. Total gain of the experimental group was significant at the .01 level of significance; total gains of the control group was significant at the .05 level.

Results indicate that despite both a lack of supplementary aid and a relatively short remediation period, the experimental group made gains in all 6 areas, whereas the control group made gains only in four. It seems reasonable to conclude that with some supplementary help and with a more sustained period of remediation, even greater gains would have been made by the experimental group.

Analysis of Variance
on Metropolitan Pre- and Post-Scores
at Dobson School

Experimental Group N=12

Subtest	Pre-Mean	Pre-s.d.	Post Mean	Post s.d.	df	SS	MS	F Ratio
Word Meaning	10.500	2.393	13.250	1.357	1	45.3750	43.3750	11.9910
Error					22	83.2500	3.7841	
Listening	10.167	1.586	11.833	2.125	1	16.6667	16.6667	4.7414
Error					22	77.3333	3.5157	
Word Matching	9.7500	2.5981	12.2500	1.7123	1	37.5000	37.5000	7.7465
Error					22	106.5000	4.8409	
Alphabet	11.667	3.725	15.500	.798	1	88.1667	88.1667	12.1482
Error					22	159.6667	7.2576	
Numbers	17.083	3.204	20.583	3.825	1	73.5000	73.5000	5.9051
Error					22	273.8333	12.4470	
Copying	9.9167	3.0883	12.4167	1.8320	1	37.5000	37.5000	5.8167
Error					22	141.8333	6.4470	
Total	68.500	15.042	85.833	7.907	1	1802.6667	1802.6667	12.4844
Error					22	3176.6667	144.3939	

Analysis of Variance
On Metropolitan Pre- and Post-Scores
at Dobson School

Control Group
N=12

Subtest	Pre-Mean	Pre-s.d.	Post Mean	Post s.d.	df	SS	MS	F Ratio
Word Meaning	8.7500	3.3063	12.4167	1.8809	1	80.6667	80.6667	11.1497 **
Error					22	159.1667	7.2348	
Listening	10.333	1.614	12.167	2.125	1	20.1667	20.1667	5.6638 *
Error					22	78.3333	3.5606	
Word Matching	7.5833	4.1001	8.9167	4.8889	1	10.6667	10.6667	.5240
Error					22	447.8333	20.3561	
Alphabet	10.250	5.101	14.500	2.111	1	108.3750	108.3750	7.1119 *
Error					22	335.2500	15.2386	
Numbers	15.583	3.919	19.167	3.881	1	77.0417	77.0417	5.0658 *
Error					22	334.5833	15.2083	
Copying	9.8333	2.8551	11.6667	2.9336	1	20.1667	20.1667	2.4069
Error					22	184.3333	8.3788	
Total	61.500	18.520	78.833	14.690	1	1802.6667	1802.6667	6.4521 *
Error					22	6146.6667	279.3939	

Adair School: First Grade Teacher, Mrs. Connally

The person responsible for diagnosis and remediation was a first-grade teacher; her class became the experimental group. These pupils were not involved in any other remedial research program. Another large, well-equipped room was available for remediation. Pupils were screened and those with developmental deficits were assigned to remedial groups by January 1971. Services of three volunteer aides made possible two 30-minute tutorial sessions, five days per week. In addition, the first grade teacher provided five minutes of individual after-school assistance to pupils requiring additional aid. No pupil attended more than three after-school sessions. Results, presented in Table , indicate superior performance by the experimental group on post-test Metropolitan scores for Word Meaning, Listening, and Matching. Both groups had improvement, significant at the .01 level, in Alphabet, Numbers, and Total Scores. It is noted, however, that gain in mean total score was 22.74 for the experimental group versus 12.83 for the control group. Furthermore, when the California Reading Test was administered in June, 1971, only one pupil in the experimental room fell below the national norms. Results serve to suggest that, in the tutorial sessions, supervision of the volunteer aides by the regular classroom teacher may be one of the most beneficial and efficient arrangements. In this instance, the classroom teacher planned the remedial session, was immediately informed of the pupil's progress, related these tutorial efforts to on-going classroom activities, and reinforced individual learning in after-school sessions.

Analysis of Variance
on Metropolitan Pre- and Post-scores
at Adair School

Experimental Group
n = 19

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Word Meaning	9.74	2.35	14.05	1.54	1	176.95	176.95	44.66 **
Error					36	142.63	3.96	
Listening	10.95	2.48	13.53	1.47	1	63.18	63.18	15.20 **
Error					36	149.68	4.16	
Matching	8.84	3.44	12.32	1.57	1	114.63	114.63	16.08 **
Error					36	256.63	7.13	
Alphabet	11.10	5.92	15.68	.95	1	199.18	199.18	11.07 **
Error					36	647.89	18.00	
Numbers	15.90	5.02	22.00	2.45	1	354.11	354.11	22.69 **
Error					36	561.79	15.61	
Copying	8.74	2.28	10.16	2.61	1	19.18	19.18	3.19
Error					36	216.21	6.01	
Total	65.26	16.64	88.00	6.17	1	4911.16	4911.16	31.19 **
Error					36	5667.68	157.44	

Analysis of Variance
on Metropolitan Pre- and Post-scores
at Adair School

Control Group
n = 12

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Word Meaning	10.25	1.96	9.42	3.32	1	4.17	4.17	.56
Error					22	163.17	7.42	
Listening	11.50	2.20	10.92	1.31	1	2.04	2.04	.62
Error					22	71.92	3.27	
Matching	8.00	3.41	10.50	1.93	1	37.50	37.50	4.88 *
Error					22	169.00	7.68	
Alphabet	11.17	2.55	15.08	1.24	1	92.04	92.04	22.86 **
Error					22	88.58	4.03	
Numbers	10.42	2.23	16.67	3.06	1	234.38	234.38	32.72 **
Error					22	157.58	7.16	
Copying	8.83	2.79	10.33	2.10	1	13.50	13.50	2.21
Error					22	134.33.	6.11	
Total	60.17	8.93	73.00	6.38	1	988.17	988.17	16.40 **
Error					22	1325.67	60.26	

Welsh School: Reading Teacher, Mrs. Noll

A well-equipped remedial reading room was available for tutorial sessions. The program was supervised by the reading teacher who also was responsible for three other reading projects (Kindergarten Readiness, Lippincott, and BRL). No aides, either volunteer or paid were available. Therefore, the reading teacher (alone) attempted to provide tutorial services. From the first week in February through the first week in May four groups were scheduled for 30 minutes each for an average of three times a week. Conditions were not conducive to learning. Students working with other teachers were continuously in and out of the room; in addition, the teacher while attempting to furnish tutorial aid, averaged six interruptions per 30-minute session: e.g., extended consultation, information, and advice. In addition, other responsibilities and commitments made it impossible for her to maintain a regular schedule. Review of Table indicates gains for either the experimental or control were practically non-existent in Word Meaning and Listening. The experimental group made significant gains in Matching, whereas the control group made significant gains in Copying. Both groups had significant achievement on Alphabet and Total Raw Score. Mean Total Score gain for the experimental group was 11.88 and 11.56 for the control. The failure of the experimental group to perform significantly better than the control group demonstrates the futility of expecting an already heavily scheduled reading teacher, who has no aides, to supply individual tutorial aid to pupils with developmental deficits.

Analysis of Variance
on Metropolitan Pre- and Post-Scores
at Welsh School

Experimental Group
n = 16

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post s.d.	df	SS	MS	F
Word Meaning	6.38	2.39	6.50	1.32	1	.12	.12	.03
Error					30	111.75	3.72	
Listening	10.06	2.29	10.12	2.82	1	.03	.03	.01
Error					30	198.69	6.62	
Matching	7.38	3.70	9.81	2.43	1	47.53	47.53	4.85 *
Error					30	294.19	9.81	
Alphabet	10.25	3.98	14.81	1.47	1	166.53	166.53	18.54 **
Error					30	269.44	8.98	
Numbers	12.44	4.08	15.56	4.82	1	78.12	78.12	3.92
Error					30	597.88	19.93	
Copying	7.56	3.79	9.19	3.76	1	21.12	21.12	1.48
Error					30	428.38	14.28	
Total	54.12	13.50	66.00	11.50	1	1128.12	1128.12	7.18 *
Error					30	4715.75	157.19	

Analysis of Variance
on Metropolitan Pre- and Post-scores
at Welsh School

Control Group
n = 16

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Word Meaning	6.25	2.08	6.38	1.89	1	.12	.12	.03
Error					30	118.75	3.96	
Listening	11.00	1.86	11.19	1.68	1	.28	.28	.09
Error					30	94.44	3.15	
Matching	8.75	2.27	10.00	2.45	1	12.50	12.50	2.25
Error					30	167.00	5.57	
Alphabet	10.88	4.00	14.50	2.61	1	105.12	105.12	9.23 **
Error					30	341.75	11.39	
Numbers	13.69	3.46	16.19	4.09	1	50.00	50.00	3.49
Error					30	429.88	14.33	
Copying	7.38	2.68	10.88	2.25	1	98.00	98.00	16.02 **
Error					30	183.50	6.12	
Total	58.56	10.47	69.13	9.87	1	892.53	892.53	8.63 **
Error					30	3103.69	103.46	

Total Groups

When comparison was made of pre and post-test performance for the experimental subjects on the Metropolitan Readiness Test, results (as set forth in Table) revealed gains significant at the .01 level on each of the six sub-tests and on the Total Raw Score. However, gains significant at the .01 level by the control group were noted four of the sub-tests but none on two - Word Meaning and Listening. To delineate further any differences in performance between the two groups on variables on which both showed improvement significant at .01 level, comparison was made of the average gain (differences between mean pre-test and mean post-test scores). On "Matching," the average gain for the experimental group was 2.78 and 1.85 for the control. Experimental group gain was 2.89 and control group gain was 2.20 on "Alphabet." Gain on "Numbers" was 4.84 for the experimental and 2.82 for the control. The "Numbers" sub-test from the Metropolitan Readiness Test tends to measure numerical concepts rather than specific arithmetical skills; while the tutorial reading skill program did not contain instruction in arithmetic, per se, conceptual development was one of the foci; hence, improvement in "Numbers," as measured in the Metropolitan Readiness Test, would be expected. Average gain for the experimental group on "Copying" was 1.21; gain for the control was 1.49. "Copying" was the only area in which average gain score for the control group exceeded that for the experimental group. Total raw score gain for the experimental group was 14.40, and 9.17 for the control group. Results suggest that the ten to twelve weeks of individualized remediation promoted a degree of gain that would not have been realized had it not been available. These gains occurred despite lack of tutorial aides, despite serious inconsistencies and inabilities to maintain remedial schedules, and despite a time for remediation of less than three months rather than the originally planned seven-month remedial period.

Analysis of Variance
of Pre- and Post-gains
in Metropolitan Readiness Test Scores

for Total Experimental Group
n = 163

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Word Meaning	7.25	2.47	8.48	3.26	1	125.17	125.17	14.97 **
Error					324	2708.90	8.36	
Listening	9.13	2.38	10.67	2.59	1	194.80	194.80	31.49 **
Error					324	2004.06	6.19	
Matching	8.34	3.41	11.12	2.19	1	632.26	632.26	77.07 **
Error					324	2657.99	8.20	
Alphabet	12.01	4.29	14.90	2.53	1	680.49	680.49	54.84 **
Error					324	4020.40	12.41	
Numbers	12.61	4.62	17.45	4.37	1	1909.57	1909.56	94.50 **
Error					324	6547.18	20.21	
Copying	6.71	3.14	7.92	3.15	1	119.05	119.05	12.00 **
Error					324	3213.41	9.92	
Total	56.12	14.36	70.52	13.16	1	16896.96	16896.96	89.14 **
Error					324	61418.22	189.56	

Analysis of Variance
of Pre- and Post-gains
in Metropolitan Readiness Test Scores

For Total Control Group
n - 138

Subtest	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Word Meaning	7.73	6.61	8.20	2.77	1	14.84	14.84	.58
Error					274	7040.80	25.70	
Listening	10.44	9.61	10.75	2.14	1	6.70	6.70	.14
Error					274	13293.66	48.52	
Matching	8.44	4.02	10.29	2.83	1	235.60	235.60	19.51 **
Error					274	3308.44	12.07	
Alphabet	12.71	5.69	14.91	2.05	1	334.84	334.84	18.32 **
Error					274	5007.36	18.28	
Numbers	13.33	6.74	16.15	3.87	1	551.09	551.09	18.28 **
Error					274	8262.13	30.15	
Copying	6.73	2.77	8.22	3.08	1	152.26	152.26	17.73 **
Error					274	2352.56	8.59	
Total	59.37	29.83	68.44	10.30	1	5679.36	5679.36	11.40 **
Error					274	136488.19	498.13	

Factor Analyses

Desire to determine the basic abilities represented by the 23-variable screening battery (Valett and de Hirsch) prompted a factor analysis of the pre-test scores obtained for these measures. Subjects who were administered the battery were the 172 randomly assigned experimental subjects. Scores for the 23 variables were intercorrelated. Initial communality estimates were squared multiple correlations. Orthogonal rotations were performed to satisfy the varimax criteria. After rotation, three factors had eigenvalues of 1.00 or greater. Because a factor with a variance less than that of any single variable hardly achieves the factor analytic goal of parsimony, only these three factors, which are presented in Table , wer interpreted.

Major loadings from all sub-tests of the Metropolitan Readiness Test combined with major loadings from five Valett sub-tests (Auditory Discrimination, Visual Motor Coordination, Visual Discrimination, Language Development, and Concept Development) and major loadings from four tests from the de Hirsch battery (Bender, Categories, Horst Reversals, and Gates Word Matching) to define a general reading readiness factor. Eigenvalue was 6.48.

The second factor was defined by loadings from Word Recognition I and Word Recognition 2. Skill in recognition of words, which is generally regarded as involving the associative processes, memory, visual discrimination, and form recognition, appeared to be an ability distinct from the more general abilities measured by the Metropolitan. Loading from one de Hirsch instrument, Number of Words Used in a Story, also contributed to the structure of the factor. Eigenvalue was 2.10.

Negative loadings from measures of perceptual acuity and motor integration defined the third factor. Deficit in one sensory channel appeared to be related to deficits in others. Structure of the factor indicated a clustering of sensory and motor deficits rather than a singular disability in one area. Eigenvalue was 1.29.

Review of final communalities for the 23 variables revealed there were four measures with final communalities which were less than .25. These four, each from the de Hirsch Battery, were Bender Gestalt, Pencil Use, Horst Reversal, and Number of Words Used in a Story.

TABLE

Factor Analysis of Scores from
De Hirsch Predictive Index, Valett Developmental Survey[1]
and Metropolitan Readiness Test

	Variable	FACTORS 1	2R	3	Final Communality*
	Predictive Index				
1.	Bender	.25	.25	-.06	.13
2.	Pencil Use	.01	.03	-.07	.01
3.	Wepman	.17	-.32	-.37	.27
4.	Categories	.45	-.04	-.15	.23
5.	Reversals	.54	.04	-.19	.33
6.	Word Matching	.56	-.11	.11	.34
7.	Word Recognition #1	-.03	.82	.03	.67
8.	Word Recognition #2	.04	.90	.06	.81
9.	Number of Words	.26	-.31	.06	.17
	Valett Developmental Survey				
10.	Motor Integration	.07	-.01	-.67	.45
11.	Tactual Discrimination	.12	-.31	-.57	.44
12.	Auditory Discrimination	.58	.01	-.37	.48
13.	Visual-Motor Coordination	.64	.03	-.23	.46
14.	Visual Discrimination	.48	.20	-.46	.49
15.	Language Development	.58	-.08	-.28	.42
16.	Concept Development	.61	.08	-.27	.45
	Metropolitan Readiness Test				
17.	Word Meaning	.58	-.34	.25	.52
18.	Listening	.54	-.17	.04	.32
19.	Matching	.66	.12	-.25	.52
20.	Alphabet	.65	.20	-.08	.47
21.	Numbers	.74	-.17	-.08	.59
22.	Copying	.56	-.09	-.11	.34
23.	Total Scores	1.00	-.07	-.04	1.00

1 = Table contains only those factors with eigenvalues of 1.00 or greater.

* = Contribution of variables to the Total 23 factors extracted from the matrix.

R + Reflectant

Comparison of Performance of Experimental and Control Groups on Total Battery

The experimental group's performance on tests included in the (1) de Hirsch Predictive Index, (2) Valett Developmental Survey, and (3) Metropolitan Readiness Test provided a differential diagnosis upon which individual remediation was based. To administer the total battery required approximately three hours per child. While the information obtained from the tests was necessary in pinpointing deficit areas in the experimental group, there was no provision for remediation in the control group. Nor was there any time budgeted for the administration of the total battery to all pupils in the control group. Nonetheless, there was desire to determine if the experimental and/or the control group made significant gains not only on the Metropolitan Readiness Test, the criterion test, but also on other areas included in the individual programs, areas measured by de Hirsch Predictive Index and the Valett Developmental Survey. To achieve this comparison three subjects were randomly selected from each of the control groups. Pre and post-scores (beginning and end of the academic year) were obtained for these persons on the total test battery (that is the Valett, the de Hirsch, and the Metropolitan). Again the previously-discussed attrition of subjects was recognized. It was possible to obtain complete pre and post-test scores on 27 experimental subjects and 22 control subjects. Gains for the experimental group are set forth in Table and in Table for the control group.

Significant gains over the three-month training period occurred for the experimental group on 20 of the 25 variables; the five which lacked significant gains were: (1) Bender Gestalt; (2) Pencil Use; (3) Word Recognition #1; (4) Word Recognition #2; and (5) Number of Words Used in a Story. However, the initial near ceiling performance of the group on Pencil Use, Word Recognition 1 and 2 precluded significant gains.

By contrast, the control subjects demonstrated significant gains on only five of the 25 variables. Significant improvement occurred on Word Recognition #1 and on four Metropolitan scores - Matching, Alphabet, Numbers, and Total Score. These,

however, are areas which are emphasized in the traditional instructional programs.

The results indicate that tutorial efforts were most beneficial in areas generally considered prerequisite to reading: i.e., visual and auditory discrimination, visual-motor coordination, language and conceptual development, as well as in areas measured by the Metropolitan Readiness Test. Screening and programming to promote development in deficit areas were successful, despite the many adverse situations and program limitations.

Analysis of Variance
on Pre- and Post-gain on Total Variables
for 27 Experimental Subjects

Test	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F	
De Hirsch									
Bender-Gestalt	11.89	3.65	13.70	5.56	1	44.46	44.46	2.01	
Error					52	1150.30	22.12		
Pencil Use	1.93	.27	2.00	0.00	1	(to be filled in)		2.08	
Error					52				
Wepman	11.30	4.06	17.74	2.35	1	560.67	560.67	50.90	**
Error					52	572.81	11.02		
Categories	2.11	.93	2.85	.46	1	7.41	7.41	13.72	**
Error					52	28.07	.54		
Reversals	5.78	2.59	8.41	1.05	1	93.35	93.35	23.89	**
Error					52	203.19	3.91		
Word Matching	7.89	2.65	9.78	3.77	1	48.17	48.17	4.54	*
Error					52	551.33	10.60		
Word Recog. Ø1	1.93	.38	1.96	.19	1	.02	.02	.20	
Error					52	4.81	.09		
Word Recog. Ø2	1.85	.53	1.89	.42	1	.02	.02	.08	
Error					52	12.07	.23		
Number of Words	132.41	103.05	92.54	144.12	1	21560.02	21560.02	1.37	
Error					52	816165.18	15695.48		
Valett									
Motor Integration	78.44	8.09	83.44	3.43	1	337.50	337.50	8.72	**
Error					52	2011.33	38.68		
Tactile Discrim.	71.78	12.67	82.22	3.84	1	1472.66	1472.66	16.80	**
Error					52	4557.33	87.64		
Auditory Discrim.	74.00	7.63	81.56	3.91	1	770.67	770.67	21.00	**
Error					52	1908.67	36.71		
Visual-Motor Coordination	66.11	6.84	79.26	6.12	1	2333.80	2333.80	55.42	**
Error					52	2189.85	42.11		

Analysis of Variance
on Pre- and Post-gain on Total Variables
for 22 Control Subjects

Test	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Valett (cont.)								
Visual Discrim.	77.45	11.55	81.54	5.21	1	184.09	184.09	2.29
Error					42	3370.91	80.26	
Language Dev.	72.00	11.34	77.46	11.40	1	327.27	327.27	2.53
Error					42	5429.45	129.27	
Concept Dev.	76.09	14.65	81.54	5.83	1	327.27	327.27	2.63
Error					42	5223.27	124.36	
Metropolitan								
Word Meaning	7.55	3.16	8.45	1.92	1	9.09	9.09	1.33
Error					42	286.91	6.83	
Listening	9.82	2.30	10.54	1.65	1	5.82	5.82	1.45
Error					42	168.73	4.02	
Matching	7.27	3.68	10.45	3.30	1	111.36	111.36	9.10 **
Error					42	513.82	12.23	
Alphabet	10.54	5.21	14.91	2.49	1	209.45	209.45	12.58 **
Error					42	699.27	16.65	
Numbers	12.00	4.34	15.73	4.43	1	152.82	152.82	7.94 **
Error					42	808.36	19.25	
Copying	7.18	2.58	8.45	3.79	1	17.82	17.82	1.70
Error					42	440.73	10.49	
Total Score	54.36	16.05	68.46	14.69	1	2184.09	2184.09	9.23 **
Error					42	9938.54	236.63	

Analysis of Variance
on Pre- and Post-gain on Total Variables
for 22 Control Subjects

Test	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
De Hirsch								
Bender-Gestalt	8.91	6.10	10.18	6.80	1	17.82	17.82	.43
Error					42	1753.09	41.74	
Pencil Use	2.00	0.00	2.00	0.00	1	0.00	0.00	.00
Error						0.00	0.00	
Wepman	12.91	4.57	14.36	5.33	1	23.27	23.27	.94
Error					42	1034.91	24.64	
Categories	2.55	1.01	2.45	.80	1	.09	.09	.11
Error					42	34.91	.83	
Reversals	7.00	2.39	6.82	2.68	1	.36	.36	.06
Error					42	271.27	6.46	
Word Matching	9.36	3.36	10.18	3.23	1	7.36	7.36	.68
Error					42	455.36	10.86	
Word Recog. Ø1	1.18	.96	1.91	.29	1	5.82	5.82	11.59 **
Error					42	21.09	.50	
Word Recog. Ø2	1.27	.98	1.55	.80	1	.82	.82	1.02
Error					42	33.82	.80	
Number of Words	166.27	141.50	147.27	137.52	1	3971.00	3971.00	.20
Error					42	817600.00	19466.68	
Valett								
Motor Integration	81.00	9.97	84.82	1.37	1	160.36	160.36	3.17
Error					42	2127.27	50.65	
Tactile Discrim.	77.09	9.45	78.00	8.69	1	9.09	9.09	.11
Error					42	3457.82	82.33	
Auditory Discrim.	76.64	9.65	76.36	13.24	1	.82	.82	.01
Error					42	5642.18	134.34	
Visual-Motor Discrimination	71.09	10.53	76.00	9.57	1	265.09	265.09	2.62
Error					42	4253.82	101.28	

Analysis of Variance
on Pre- and Post-Gain on Total Variables
for 27 Experimental Subjects

Test	Pre-Mean	Pre-s.d.	Post-Mean	Post-s.d.	df	SS	MS	F
Valett (cont.)								
Visual Discrim.	78.56	8.73	82.56	3.66	1	216.00	216.00	4.82 *
Error					52	2329.33	44.79	
Language Dev.	68.44	7.26	78.67	7.69	1	1410.67	1410.67	25.25 **
Error					52	2904.67	55.86	
Concept Dev.	74.89	5.23	82.22	2.24	1	726.00	726.00	44.87 **
Error					52	841.33	16.18	
Metropolitan								
Word Meaning	7.33	2.04	9.33	2.76	1	54.00	54.00	9.18 **
Error					52	306.00	5.88	
Listening	8.70	1.90	10.70	2.14	1	54.00	54.00	13.17 **
Error					52	213.26	4.10	
Matching	8.59	3.64	11.70	1.96	1	130.67	130.67	15.30 **
Error					52	444.15	8.54	
Alphabet	13.70	3.55	15.63	1.01	1	50.07	50.07	7.36 **
Error					52	353.93	6.81	
Numbers	13.59	2.82	18.44	3.06	1	317.80	317.80	36.79 **
Error					52	449.19	8.64	
Copying	6.15	1.96	7.63	2.69	1	29.63	29.63	5.36 *
Error					52	287.70	5.53	
Total Score	58.00	7.06	73.44	7.15	1	3220.17	3220.17	63.75 **
Error					52	2626.67	50.51	

CONCLUSIONS:

1. It appears that there are widespread deficits in perceptual areas related to reading in children entering first grade; that early diagnosis is both essential and viable in order to prescribe for individual needs in these areas.
2. It also appears that children respond readily to this kind of training and that this remediation is essential if the child is to respond positively to initial reading instruction. Results, even within the many constraints and limitations of this program, indicate that amelioration of perceptual deficits in areas related to reading before formal reading instruction is initiated, will help prevent subsequent reading difficulty.
3. All first grade and K teachers should be trained to use such diagnostic and prescriptive techniques.
4. The diagnostic battery should be given to all children entering first grade (or those in K) where feasible. (Though this may seem time-consuming, it is in the long run a very economical and profitable use of teacher time as it will serve as a deterrent to much future reading disability.) Those children indicating needs in these areas should have special prescriptive training either by a teacher so trained, or by aides and/or paraprofessionals under the supervision of the teacher. Interim or transitional classes for such children might be formed.
5. Regularly scheduled periods of remediation in areas of shown lag need to be scheduled until the deficits are ameliorated. Aides and/or other paraprofessional help is a necessity if the classroom teacher is to be in sole charge of the program.
6. The factor analysis indicates that the battery might be shortened with no loss in its diagnostic value by dropping the following subtests:

   a. Number of words in a story
   b. Either the Wepman or the auditory discrimination of the Valett
   c. Bender-Visual-Motor Gestalt adaptation
   d. Pencil use

Further reduction in testing time might be achieved by the administration of certain subtests to groups of children (e.g. Horst Reversals, Gates Word Matching)

7. There appears to be a general perceptual consistancy in children; when developmental deficits are indentified in one area of perception (i.e. visual) there is a strong suggestion that similar deficits will appear in other perceptual areas (ie. auditory, visual-motor). This general entropy within a given child indicates that children who need remediation in one perceptual area will probably need it in others.

Recommendations:

1. Each program should have at least one aid and/or paraprofessional in the classroom.

2. Flexible transitional classes might be set up for those children who, on entering K or 1st grade, are found to have perceptual deficits, so that they can be given the training necessary to fill in the developmental gaps before formal reading instruction is begun.

3. A replication of the program should be considered with more carefully controlled conditions and with a full time supervisor or director.

4. A longitudinal study should be planned to follow the progress of the experimental and control at the end of 2nd and 3rd grade to see if the superior gains made by the experimental group are maintained.

5. The revised, shorter battery should be used as the basic diagnostic instrument, dropping the subtests mentioned in point six of conclusions.

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